

18. On Two British Entomostraca belonging to the Orders Copepoda and Ostracoda. By G. STEWARDSON BRADY, M.D., LL.D., D.Sc., F.R.S., C.M.Z.S.

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The two species here described are the result of a recent re-examination of material collected many years ago. The first named species occurred abundantly in a gathering made by the Rev. Canon Norman, F.R.S., in Loch Ness, Scotland. The other species is, unfortunately, represented by only one specimen taken by myself near Arundel in Sussex.

Order COPEPODA.

DIAPTOMUS PUSILLUS, sp. n. (Pl. XXXVIII.)

Female.—Length 1 mm. Body slender; seen dorsally the anterior portion (cephalothorax) is quite thrice as long as broad, its anterior extremity well rounded, posterior broadly truncate with acutely mucronate lateral angles (fig. 3). Abdomen two-segmented (fig. 3), the first (genital) segment twice as long as the following segment, wide and bulbously dilated at the base, which is produced laterally and bears two aculeiform setæ; caudal rami not much longer than broad, terminal setæ very feebly plumose. Anterior antennæ slender and almost entirely destitute of marginal hairs, extending when reflexed as far as the apices of the caudal setæ (fig. 1). Basal joint of the last pair of legs (fig. 4) somewhat dilated, its outer margin prominent in the middle and bearing a short spine-like seta; inner branch short, simple, inarticulate, truncated at the apex, which bears two or three very minute setæ; outer branch about three times as long as the inner branch, its last joint forming a strong dagger-shaped claw to the dilated base of which is attached a short spine. Ovisacs very small, spherical, containing not more than one or two ova.

Male somewhat smaller than the female, length 0.98 mm. Right anterior antenna slender, very slightly dilated in the middle (fig. 2), the 13th joint bearing a single strong spine, the 10th and 11th each a very small needle-like hair, the other joints almost or entirely hairless; antepenultimate and penultimate joints simple, elongated, last joint small, bearing a few apical filaments (fig. 6). Last pair of legs strongly developed (fig. 5), the right much the larger and reaching beyond the extremities

* For explanation of the Plates see pp. 233-4.

of the caudal rami; no inner branch; distal joint ending in a long falcate claw and bearing a hook-like spine on its external margin; foot of the left side reaching scarcely as far as the two proximal joints of the right foot, imperfectly three-jointed (the basal joint being imperfectly divided), second and third joints small, tapering to a sharp point.

This interesting little species was found abundantly in a gathering made by my friend the Rev. Canon Norman, F.R.S., many years ago (1885) and kindly given to me by him. It had remained unnoticed, partly on account of its small size and partly owing to its being mixed up with numberless other Copepoda and Cladocera, until discovered on a recent re-examination of the collection. My attention was drawn to it chiefly by the very conspicuous dark coloration of the spermatophores, which were attached in unusually great numbers to the females—frequently in bunches of three or four together; the small spherical ovisacs, also very deeply pigmented, formed another mark of recognition. The gathering was from Loch Ness “off Drumnadrochit in the open lake.” In several other gatherings made by Dr. Norman during the same tour I have found no trace of this species.

Order OSTRACODA.

ARUNELLA, gen. nov.

Animal like *Candona* except that there are three pairs of ambulatory legs in addition to the flexile fourth pair, which is contained within the shell; also a pair of setiferous appendages arising from the ventral surface of the body—probably near the base of the first pair of legs.

ARUNELLA SUBSALSA, sp. n. (Pls. XXXIX. & XL.)

Male.—Antennules six-jointed, rather sparingly setiferous (Pl. XXXIX. fig. 1); antennæ stout, six-jointed, destitute of natatory setæ, no apical claw (fig. 2), but bearing a few stout setæ, antepenultimate joint with a pair of rod-like sensory appendages (fig. 3); mandibles like those of typical *Candona*, mandibular palp four-jointed, with a small 7-setose branchial plate (fig. 4). First pair of maxillæ composed of a body with four digitate segments to which is attached an elongated setiferous branchial plate as in the normal Cyprididæ (fig. 5); second pair strongly prehensile, each bearing a small setiferous appendage (Pl. XL. figs. 5, 6). First and second pairs of feet four-jointed, rather densely hispid with small adpressed hairs (figs. 1, 2), last joint with two strong apical claws, penultimate joint with a fascicle of about six spine-like setæ; the third pair of feet (fig. 3) destitute of hairs but armed at the extremity with a long falcate claw; fourth pair flexuous and similar to those of the normal Cyprids (fig. 4). Arising from the ventral side of the abdomen, probably near the bases of the first pair of legs, is an appendage

consisting of two slender, hispid, linear branches—unjointed, but bearing long apical and lateral setæ—with a nipple-shaped prominence separating their bases (Pl. XXXIX. fig. 6). Caudal rami slender, bearing three terminal setæ, and one near the middle of the posterior margin (Pl. XL. fig. 7); copulatory organs of the usual complex type (fig. 8); ejaculatory duct encased in a very dense and massive capsule (Pl. XXXIX. fig. 7); whorls of the duct very indistinctly visible through the fibrous covering.

Female unknown.

Of this remarkable species I have seen only one example, a male. It was found unexpectedly on a re-examination of some material collected many years ago in ditches by the side of the River Arun, near Arundel, the water being, no doubt, slightly brackish. The shell was so much encumbered with muddy débris that it could not be distinctly seen, my attention being drawn to it by the remarkably strong projection of the male organs below the margins of the valves. The animal presents characters intermediate between the Cyprididæ and Cytheridæ, the three pairs of ambulatory legs corresponding to those of the Cytheridæ, while the following pair and the post-abdominal rami are like the similar structures in Cyprididæ. But there is in addition to these limbs a remarkable biramosse appendage which was detached in the process of dissection, but was probably derived from the body of the animal close to the anterior legs. This structure I take to be possibly homologous with one described by G. O. Sars* under the name "processus piliferus," and stated by that author to be found between the feet of the first pair in the male of *Bairdia subdeltoidea*. Other noteworthy characters are the presence of a pair of rodlike sensory appendages on the antepenultimate joint of the antennæ, and the hispid clothing of the anterior legs and "processus piliferus."

I regret very much that no further specimens of *Arunella* are to be found in my collected material, but must hope that some future collector may be fortunate enough to find it, and thus be able to place the species on a more secure basis. It must evidently be hunted on the muddy bottoms of the ditches, its swimming powers being to all appearance non-existent.

EXPLANATION OF THE PLATES.

PLATE XXXVIII.

Diaptomus pusillus.

- Fig. 1. Female seen laterally, $\times 84$.
2. Male seen from below, $\times 84$.
3. Abdomen of female, with attached spermatophores, $\times 140$.
4. Foot of fifth pair, female, $\times 300$.
5. " " male, $\times 140$.
6. Distal " " joints of right anterior antenna of male, $\times 240$.

* 'Nye Bidrag til Kundskaben om Middelhavets Invertebratfauna,' p. 128, pl. xviii. fig. 12.

PLATE XXXIX.

Arunella subsalsa, ♂.

- Fig. 1. Antennule, $\times 140$.
 2. Antenna, $\times 140$.
 3. Sensory seta of antenna, $\times 300$.
 4. Mandible and palp, $\times 140$.
 5. Maxilla of first pair and labium, $\times 84$.
 6. Processus piliferus, $\times 84$.
 7. Portion of ejaculatory duct and sac, $\times 84$.

PLATE XL.

Arunella subsalsa, ♂ cont.

- Fig. 1. Foot of first pair }
 2. " second pair } $\times 84$.
 3. " third pair }
 4. " fourth pair, $\times 140$.
 5. Posterior maxilla of right side, $\times 140$.
 6. " " left side, $\times 140$.
 7. Caudal ramus, $\times 84$.
 8. Copulatory organ, $\times 84$.

19. The Dwarf Buffalo of Southern Nigeria; with a Revision of the Dwarf Buffaloes of Western Africa*. By R. LYDEKKER, F.R.S., F.Z.S.

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(Text-figures 42-44.)

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In 1910 I gave an account of certain Dwarf Buffaloes seen and shot by Lieut. H. J. L. Thompson in the Yala country of Southern Nigeria, between the Aloda towns of Echimoga and Iveku-Okaku, in an open grassy country watered by tributaries of the Yaké†. The adult bulls were described as almost wholly black, and the cows as dun or khaki-coloured; immature bulls being also dun. As I could not obtain specimens of these Buffaloes for the British Museum, I refrained from giving them a name. Recently, however, Lieut. A. W. Hunt, R.N., has brought home from Southern Nigeria heads of Buffaloes doubtless belonging to the same race, and as he has presented one of these, a cow, to the Museum, the time has come for naming the South Nigerian Buffalo.

* [The complete account of the two new races described in this paper appears here, but since the names and preliminary diagnoses were published in the 'Abstract,' they are distinguished by being underlined.—EDITOR.]

† See my book 'The Ox and Its Kindred,' p. 242, 1912; in line 10 from bottom, cow should be bull.